DOCUMENT RESUME

ED 212 994 CS 006 506

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TITLE Reading Achievement and Linguistic Stages: A Comparison of Disabled Readers and Chomsky's 6- to 10-Year-Olds.
PUB DATE Nov 81
NOTE 27p.; Paper presented at the Annual Meeting of the National Reading Conference (31st, Dallas, TX, December 2-5, 1981).

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Age Differences; *Developmental Stages; Elementary Education; Intelligence; *Language Acquisition; Learning Disabilities; Listening Comprehension; *Reading Achievement; Reading Comprehension; *Reading Difficulties; *Reading Research; Socioeconomic Status; *Syntax

ABSTRACT

To assess and then compare stages of language acquisition in disabled readers with those identified by Chomsky in a study of normal readers, a study examined (1) whether the order of emergence of certain syntactic structures is the same for six to ten-year old disabled readers as it was for Chomsky's normal readers, (2) whether there are differences between disabled readers and Chomsky's normal readers in their comprehension of these syntactic structures, (3) whether the number of subjects at each of the five linguistic stages differs according to type of reader, and (4) the extent to which measures of reading exposure, reading achievement, age, IQ, and socioeconomic status relate to stages of linguistic development in disabled readers. The listening comprehension of sixty disabled readers was tested on all five of Chomsky's syntactic structures. The children and their parents were also interviewed to obtain an estimate of the children's reading background and current reading ability. Results showed that disabled readers differed significantly from normal readers in the number of syntactic structures comprehended and the number of subjects at each of the five linguistic stages. Only the syntactic complexity level of material read or listened to correlated significantly with the linguistic state of development. No relationship was found between linguistic state of development and any of the following: reading achievement, age, IQ, and socioeconomic status. (Author/HOD)

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READING ACHIEVEMENT AND LINGUISTIC STAGES:

A COMPARISON OF DISABLED READERS AND CHOMSKY'S 6- TO 10-YEAR-OLDS

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NOVEMBER 1981

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READING ACHIEVEMENT AND LINGUISTIC STAGES: A COMPARISON OF DISABLED READERS AND CHOMSKY'S 6- TO 10-YEAR-OLDS

As a result of Chomsky's (1969) landmark study of children's language development, it is no longer assumed that an individual has mastered English syntax by about age five. Instead, the natural process of acquiring syntactic structures is thought to extend into the early school years, and perhaps beyond (Mavrogenes, 1978). A review of the literature clearly suggests that children between the ages of six and ten pass through an invariant sequence of stages in acquiring the ability to aurally comprehend complex syntactic structures (Palermo & Molfese, 1972). However, aside from Goldman's (1976) comparison of low, medium, and high skilled readers on two of those structures, relatively little has been done to substantiate their order of emergence in disabled readers, aged six to ten.

The primary purpose of the present study was to assess and then compare stages of language acquisition in disabled readers with those identified in Chomsky's subjects. A secondary purpose was to examine the relations of reading exposure, reading achievement, age, IQ, and socioeconomic status to stages of linguistic development in disabled readers.

Stages of Linguistic Development After Age Five

Contrary to Menyuk's (1963, p. 419) assertion that "all basic structures used by adults to generate their sentences can be found in the grammar of nursery school children", Chomsky (1969, 1972) found that youngsters aged six to ten demonstrated a steady growth in linguistic knowledge.

In her study of 36 predominantly middle-class children, Chomsky focused attention upon listening comprehension tasks which involved five complex grammatical structures (easy to see, promise, ask, and, and although). All five structures violated the Minimum Distance Principle and involved syntactic comprehension of sentences in which the surface structure subject was not the deep structure subject. In sentences that conform to this principle, the noun phrase that immediately precedes an infinitive verb is the subject of that verb. Thus, in "C-3PO wants Luke Skywalker to leave" it is Luke Skywalker who does the leaving, but in "C-3PO promises Luke Skywalker to leave" it is C-3PO who does the leaving.

By assessing children's competence in dealing with each of the five structures, Chomsky was able to show that they were acquired by stages in the order listed. Stage 1 children failed all five constructions; Stage 2 passed easy to see and failed the others; Stage 3 passed easy to see and promise but failed the others; Stage 4 passed all but although; and Stage 5 children passed all five constructions. Although the ages at which her subjects reached each stage varied considerably, the order of progress from least complex to most complex did not. As Chomsky (1972, p. 5) noted, "This has been a basic and repeated finding of longitudinal studies with younger children at earlier stages of language development." The research of Van Metre (1974) involving monolingual and bilingual children served to enhance the generalizability of Chomsky's stage analysis. Kessel (1970), too, found that children beyond the age of five apparently pass through an invariant sequence in their acquisition of the five syntactic structures.

However, an exception to this orderly acquisition pattern was noted by Alvermann and Wiebe (1978) in a pilot study designed to substantiate Chomsky's stages of language development in 18 disabled readers enrolled in a summer reading clinic. Of the six who failed to follow the established pattern, five were reading two or more years below their expectancy level. Though limited by a small sample size, results of the pilot did suggest that knowledge and/or use of certain syntactic structures may be differentially acquired by different types of readers.

Reading and Other Related Measures

The second part of Chomsky's (1972) study included a survey of subjects' reading backgrounds and current reading habits. Parents and children were interviewed to determine the degree of reading exposure for each subject. Factors such as the syntactic complexity level for favorite books named, number of trips to the library, and time spent reading or listening to someone else read were assessed. Mean numerical scores calculated from the child and parent interviews were found to relate positively to linguistic stage.

Reading achievement, though not a primary concern of Chomsky's, was related positively to stages in language development for disabled readers in Alvermann and Wiebe's pilot study. Based on Applebee's (1977) review of the literature (largely a summary of the Goodmans' work on miscue analysis), it seems clear that the degree of implicit syntactic knowledge brought to bear on any comprehension task is in direct proportion to one's reading achievement. Therefore, a measure of reading achievement was included in the present investigation.

As children mature, they become better able to comprehend (Chomsky, 1972) and productively control (Andolina, 1980) complex syntactic structures. This is not surprising given the common assumption that linguistic awareness reflects an invariant, developmental sequence of stages. Somewhat unexpected, however, were the results of two studies (Alvermann & Wiebe, 1978; Goldman, 1976) which suggested that reading achievement may be a better predictor of success in acquiring syntactic structures than either age or IQ. Still, caution must be exercised in making any directional statements about reading achievement and syntactic analysis skills. As Goldman warned, although it seems likely a 10-year-old reading at grade level will perform better on a range of linguistic tasks than a 10-year-old reading below grade level, it is premature to make such claims based on the available research.

As opposed to age, ample evidence exists to suggest that socioeconomic status (SES) is related to a youngster's stage of syntactic maturity (Chomsky, 1972; Mavrogenes, 1977, 1978; Stotsky, 1975). According to Bernstein (1970), socioeconomic status affects children's language development by encouraging either rigidity in syntactic organization (lower SES family groups) or experimentation with grammatical structure (upper SES family groups). Loban (1976), too, has offered strong support for the notion that poor syntactic comprehension is related to low socioeconomic status.

In consideration of the research to date, this study proposed to answer the following questions: 1) Is the order of emergence of certain

syntactic structures the same for 6- to 10-year-old disabled readers as it was for Chomsky's normal readers? 2) Are there differences between disabled readers and Chomsky's normal readers in their comprehension of those syntactic structures? 3) Does the number of subjects at each of the five linguistic stages differ according to type of reader (normal versus diaabled)? 4) To what extent do measures of reading exposure, reading achievement, age, IQ, and socioeconomic status relate to stages of linguistic development in disabled readers?

Method

Subjects

Sixty disabled readers, aged six to ten who attended elementary school in Cedar Falls, Iowa and/or the University of Northern Iowa's Reading Clinic were selected as subjects in this study. The following procedure was used to define a reader as disabled. First, a reading expectancy level for each child was computed using Bond, Tinker, and Wasson's (1979) formula. Second, the child's most recent total reading score from the Iowa Test of Basic Skills was compared to his or her reading expectancy level. Third, discrepancies between reading expectancy and reading achievement which exceeded the limits set by Bond et al. were considered indicative of a reading disability. Nearly all of the subjects selected were receiving some type of reading instruction outside the classroom; e.g., Title I reading, LD resource room, and/or private tutoring. Insofar as possible, a cross section of children in terms of age, grade level, sex, and minority status (13% Black) made up the final sample. The mean age was 8.67 years (S.D. = 1.25) and the mean grade equivalent on the Iowa Test of Basic Skills reading subtest was 1.92 (S.D. = .89). All subjects were given individual intelligence

tests. Mean IQ on the Wechsler Intelligence Scale for Children - Revised (WISC-R) was 100.93 (S.D. = 11.02). A majority of the students' parents were employed in blue collar jobs, primarily at John Deere Tractor Works in Waterloo, Iowa.

Materials

Chomsky's five complex syntactic structures, easy to see, promise, ask, and, and although, were used to assess subjects' linguistic development. These test constructions required students to manipulate various objects in response to the examiner's questions and directions. The easy to see construction required a doll with eyes that closed. For that and the promise construction, the present investigator used models of two Star Wars characters, C-3PO and Luke Skywalker, in place of Chomsky's Bozo and Donald Duck. These substitutions had worked well in the pilot study, especially with the older children. The ask construction required a book, a piece of paper, pencil, pencil box, and two sets of test pictures. One set showed a girl standing by an easel asking a boy what to paint and vice versa. The other set showed a boy asking a girl which shoes to wear and vice versa. For the and and although test constructions, prepared sets of statements and questions were read to the child. Additional materials used by the examiner included the Interviewer's Worksheet, the Parent Interview Questionnaire, and the Child Interview Questionnaire. The latter two instruments, modeled after Chomsky's, focused on the length of time a child spent reading or listening to someone else read, number of years of nursery school attendance, frequency of child's visits to the library, favorite books reread, and so on. The complexity levels of books named by either the parent or the child were computed using Granowsky's and Botel's (1974) formula.

Procedure

Data collection proceeded in three phases. In phase one, information related to reading achievement and IQ was gathered for the purpose of selecting subjects on the basis of their reading disabilities. Two skilled examiners who had had special training in the administration and interpretation of the WISC-R were employed. In phase two, this investigator and one trained research assistant individually tested each subject's listening comprehension on all five of Chomsky's syntactic structures. Since four of those five structures required a child to demonstrate an understanding of the construction when used in simple sentences, the examiner engaged the subject in conversation to determine this competency before proceeding to ask questions concerning the test construction itself. A child was credited with having passed or failed a particular syntactic structure based on the criteria established by Chomsky (1972). The Interviewer's Worksheet (see Appendix) contains that information. Following the test portion of the session, each child was interviewed to determine his or her exposure to reading. Total time spent with each subject was approximately 30 minutes. All sessions were conducted in a quiet room within the subject's school. In phase three, parents were interviewed for the purpose of gaining information concerning the child's reading background and current reading activity. In all but seven instances, the mother rather than the father was interviewed. Each parent interview lasted approximately 30 minutes. More than half the contacts were in person; the remaining ones were by telephone.

Results

Chomsky's method of stage analysis was used to determine if the order of emergence of certain syntactic structures was the same for disabled readers

as for normal readers. The results are presented in Tables 1 and 2. Thirty-six disabled readers followed the previously established developmental sequence; 24 did not. For the 60 percent whose response patterns followed Chomsky's linguistic stages, the mean grade equivalent for reading achievement was 1.70 (S.D. = .90), mean age, 8.53 (S.D. = 1.17), and mean IQ, 103.61 (S.D. = 9.98). For the remaining 40 percent, means and standard deviations for reading achievement, age, and IQ were $\bar{X}$=1.84 (S.D. = .80), $\bar{X}$=8.94 (S.D. = 1.32) and $\bar{X}$=96.92 (S.D. = 11.48), respectively. The number of subjects in Chomsky's study and their range in age have been enclosed in parentheses in Table 1.

Insert Tables 1 and 2 about here

Table 3 summarizes the passes and failures of disabled readers as compared to normal readers on listening comprehension tasks involving the syntactic structures. Using Yates' correction factor in a 2x2 chi-square comparison of the total passes and failures for the two reader types, the observed differences between the groups were significant, $\chi^2(1)=5.67$, $p < .025$. Those differences are expressed as percentages of correct responses for each of three reader types in Figure 1. For this comparison, reader types were classified according to Chomsky's stage analysis. Hence, Normal (Developmental) was used to represent her original 36 subjects because they were normal readers and they followed a developmental pattern in language acquisition. The 36 disabled readers in the present study whose response patterns matched those of Chomsky's subjects were classified as Disabled Developmental, while the 24 disabled readers whose response patterns did not match were labeled as Disabled Unclassified. Although members of the latter group did not demonstrate

Table 1

Developmental Stages in 36 Disabled Readers'

Acquisition of Syntactic Structures

	Easy to See	Promise	Ask	And	Although
Stage 1 n=13 (4)[a]	-	-	-	-	-
Age: 6.7[b] - 9.4					
(5.9 - 7.1)					
Stage 2 n=18 (9)	+	-	-	-	-
Age: 6.10 - 10.4					
(5.9 - 9.5)					
Stage 3 n=2 (12)	+	+	-	-	-
Age: 8.4 - 10.6					
(6.1 - 9.9)					
Stage 4 n=3 (7)	+	+	+	+	-
Age: 8.9 - 10.5					
(7.2 - 10)					
Stage 5 n=2 (4)	+	+	+	+	+
Age: 9.2 - 9.10					
(7.6 - 9.9)					

Note: + Success - Failure

[a]Parentheses denote Chomsky's findings

[b]6.7 is read 6 years, 7 months

Table 2

Unclassifed Acquisition Pattern

of Remaining 24 Disabled Readers

Number/Age	Easy to See	Promise	Ask	And	Although
n = 1, age 9.6[a]	-	-	+	-	-
n = 1, age 10.2	-	-	-	+	-
n = 1, age 8.11	-	+	+	-	-
n = 1, age 8.6	-	+	-	+	-
n = 1, age 8.1	-	-	+	+	+
n = 3, age 6.11 - 9.9	+	-	+	-	-
n = 5, age 6.8 - 10.6	+	-	-	+	-
n = 7, age 7.7 - 10.11	+	-	+	+	-
n = 2, age 9.1 - 10.11	+	-	+	-	+
n = 1, age 10.11	+	-	-	+	+
n = 1, age 9.9	+	+	-	+	+

Note: + Success - Failure

[a]9.6 is read 9 years, 6 months

an orderly development in their acquisition of linguistic stages, as a group their percentage of correct responses on three syntactic constructions, ask, and, and although, exceeded that of either the Normal or Disabled Developmentals. Furthermore, in all but one instance, the promise construction, the Disabled Unclassifieds out-performed the Disabled Developmentals.

Insert Table 3, Figure 1 about here

Mean scores for each type of reading group (Normals, Disabled Developmentals, and Disabled Unclassifieds) on three variables (age, IQ, and reading achievement) were calculated to determine if a relationship existed between those variables and performance on ask, and, and although. A visual inspection of the results (Table 4) revealed that 1) either no pattern existed, or 2) the pattern did not logically fit the results. As an example of no pattern for age, on the ask construction the Disabled Unclassifieds were older as a group ($\bar{X}$=9.1) than the Normals ($\bar{X}$=8.2) and younger than the Disabled Developmentals ($\bar{X}$=9.5), while on although, the Disabled Unclassifieds were older ($\bar{X}$=9.9) than either the Normals ($\bar{X}$=8.7) or the Disabled Developmentals ($\bar{X}$=9.6). A definite pattern was evident for IQ (Normals > Disabled Developmentals > Disabled Unclassifieds), but it did not logically account for the Unclassifieds' superior performance on ask, and, and although. Only on although did the Disabled Unclassifieds' mean reading grade equivalent score of 2.5, compared to the 1.9 of the Disabled Developmentals, suggest a relationship between performance on that specific structure and reading achievement. Even then, the pattern did not hold in a comparison between the Disabled Unclassifieds and the Normals. Finally, no attempt was made to compare the three reader types on complexity level of material read or listened to because Chomsky's (1971) complexity index was based on different scoring criteria than those used in the present study.

Insert Table 4 about here

Table 3

Passes and Failures of Two Reader Types

On Listening Comprehension of Five Syntactic Structures

Structure	Reader Type: Normal (Chomsky) (n=36) Passed	Failed	Disabled (n=60) Passed	Failed
Easy to see	32	4	42	18
Promise	23	13	10	50
Ask	11	25	20	40
And	11	25	22	38
Although	4	32	7	53
Total	81	99	101	199

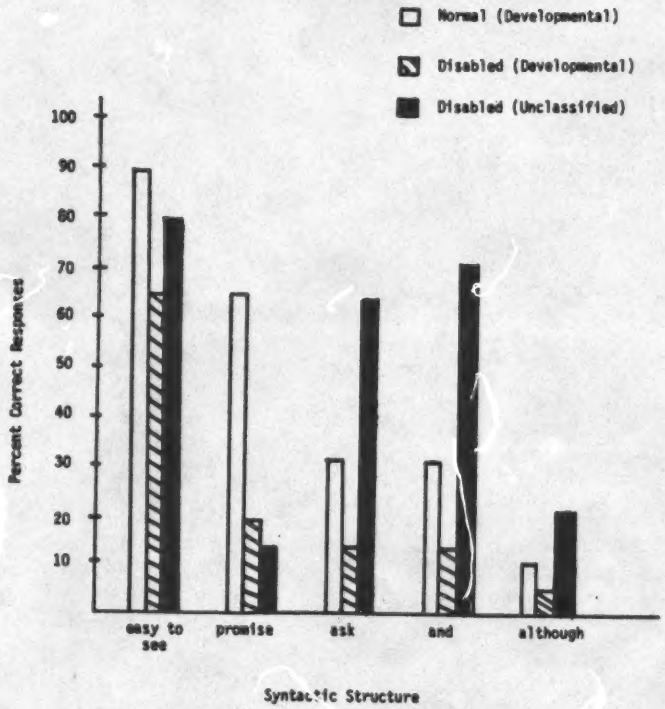

Fig. 1 Listening Comprehension Performance on Five Syntactic Structures

Table 4

Means Scores of Reader Type on Age, IQ, and Reading Achievement for Three Syntactic Structures

	Syntactic Structure								
	ASK			AND			ALTHOUGH		
Reader Type	Age	IQ	Reading Achievement	Age	IQ	Reading Achievement	Age	IQ	Reading Achievement
Normal Developmentals[a]	8.2	122	4.4	8.9	129	5.4	8.7	137	4.9
Disabled Developmentals	9.5	107	2.5	9.5	107	2.5	9.6	111	1.9
Disabled Unclassifieds	9.1	97	1.9	8.8	97	1.9	9.9	97	2.5

[a]Data taken from the full report (Chomsky, 1971).

Table 5 shows the number of subjects for two reader types (Normal Developmental and Disabled Developmental) at five different stages of linguistic development. The observed frequencies expressed as proportions are included in parentheses. In a chi-square comparison of the two groups, the observed differences were highly significant, $\chi^2(4) = 16.12$, $p < .005$. As indicated, 80 percent of the Disabled Developmentals were at Stage 2 or lower while only 36 percent of Chomsky's Normal Developmentals ranked that low.

Insert Table 5 about here

Table 6 reports the average scores of the Disabled Developmentals on a variety of measures (exposure to reading materials, age, IQ, SES, and reading achievement) at each stage of language development. Using Kendall's tau rank order correlations, only syntactic complexity level of material (either read or listened to) correlated significantly with linguistic stage, $\tau = .419$, $p < .01$.

Insert Table 6 about here

Discussion

The fact that 60 percent of the children studied passed through the same sequence of stages as Chomsky's subjects in acquiring the ability to comprehend five complex syntactic structures would suggest that the nontransitive nature of language development observed in normal readers, aged 6 to 10, holds true, in part at least, for disabled readers as well. This finding corroborated the results of the pilot study mentioned earlier (Alvermann & Wiebe, 1978) in which 67 percent of the reading disabled group (n=18) followed Chomsky's stages in language development.

Table 5

Observed Frequencies (and Proportions) of

Two Reader Types at Different Stages of Linguistic Development

	Reader Type	
	Normal Developmental n = 36	Disabled Developmental n = 36
Stage 1	4 (.11)	13 (.36)
Stage 2	9 (.25)	16 (.44)
Stage 3	12 (.33)	2 (.06)
Stage 4	7 (.20)	3 (.08)
Stage 5	4 (.11)	2 (.06)

Table 6

Average Scores of Disabled Developmentals at Each Linguistic Stage on Reading Exposure, Age, IQ, SES, and Reading Achievement

Measures	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Reading Exposure					
Child Interview (numerical scores)	8.5	8.6	10.5	9.0	13.5
Parent Interview (numerical scores)	11.2	9.9	10.5	9.7	15.0
Syntactic Complexity Level of Material Read or Listened to (grade level)	1.0	1.8	2.4	3.1	3.2
Chronological Age	7.11[a]	8.8	9.5	9.5	9.6
IQ (WISC-R)	100.6	105.89	97.0	104.0	111.0
SES (Census Bureau Scale 01-99)	28	38	25	49	28
Reading Achievement (ITBS grade equivalent)	1.3	1.7	1.8	2.8	1.9
	n=13	n=16	n=2	n=3	n=2

[a]7.11 is read 7 years, 11 months

It is interesting to note that although Chomsky reported that everyone over the age of 7.1 succeeded in comprehending the easy to see construction, it was not until after the age of 9.4 that everyone succeeded in the present investigation. However, differences between the two types of readers in the oldest ages of attainment on each of the other four syntactic structures amount to less than one year. Apparently for all of the structures except easy to see, age is less of a distinguishing factor in disabled readers' acquisition of language than individual rate of development.

Failure to account for the Disabled Unclassifieds' superior performance on ask, and, and although, compared to the two other reader types, led to consideration of Palermo and Molfese's (1972) views on instability in linguistic development. According to them, "the periods between 5 and 8 years and between 10 and 13 years are marked by instability in linguistic development . . . followed by growth to new levels and subsequent stable linguistic performance" (p. 422). If as they also have suggested, the Minimum Distance Principle is worked out (accompanied as it is by high error rates) during the first period of instability, then a disproportionately large number of students aged 5-8 in the two developmental groups might help to account for such poor performance on ask, and, and although. In fact, it was noted that 71 percent of the Normal and Disabled Developmentals were between the ages of 5 and 8 compared to only 46 percent of the Disabled Unclassifieds. Specification of the nature of any relationship between periods of linguistic instability and performance on tests of syntactic knowledge awaits further research. However, it may be more than coincidental that the periods described by Palermo and Molfese correspond to Piaget's (1970) cognitive development stages and to Epstein's (1978) brain growth "spurts".

Finding that significantly greater numbers of disabled readers than normal readers were at Stage 2 or below is of interest from two standpoints. One, it supports Goldman's (1976) earlier research with low- and high-skilled readers on listening tasks involving two of Chomsky's syntactic structures. Two, knowing that a child is behaving more like a disabled reader than a normal one in his or her ability to comprehend oral language may provide valuable diagnostic information for the reading clinician or reading specialist. However, caution needs to be used in assessing the implications of such information because the choice of the five syntactic structures was highly arbitrary in the first place.

Of the the three sources of reading exposure that were examined, child interview, parent interview, and syntactic complexity level of material either read or listened to, only the latter correlated significantly and in a positive direction with subjects' stages in language development. Since this implies that a disabled reader's exposure to complex syntactic structures found in printed materials goes hand in hand with his or her ability to comprehend complex oral language, parents and teachers may want to consider the effectiveness of reading to disabled readers from material deemed "well above their level".

That chronological age, IQ, and reading achievement did not correlate significantly with disabled readers' stages in language development may have been partially due to the small numbers of subjects, n=2, n=3, n=2, at Stages 3, 4, and 5, respectively. Some basis for this explanation can be seen in Table 6. Note that for Stages 1 and 2, where n is reasonably large, a developmental trend is observable for each of the three variables, age, IQ, and reading achievement. However, for Stages 3, 4, and 5 that trend is either halted or reversed. Finally, although the absence of a relationship

between socioeconomic status and syntactic maturity may be similarly explained, it is equally possible that the flatness of the population sampled produced the non-significant finding.

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Appendix

Interviewer's Worksheet

Child's Name_____ Age:_____years_____months

Address_____ Telephone number_____

_____

Interviewer's Name_____ Date of test_____

EASY TO SEE

1. Is the doll easy to see or hard to see (circle easy or hard)
2. Why?
3. Can the subject make the doll easy/hard to see? (circle yes or no)

PROMISE (Criterion for success: 4 out of 5 correct)

Does the subject know the meaning of promise? Yes No

1. Luke Skywalker promises C-3PO to turn around. Make him do it.
   Correct Incorrect
2. C-3PO promises Luke Skywalker to hop up and down. Make him hop up and down. Correct Incorrect
3. Luke Skywalker promises C-3PO to stand on the book. Make him do it.
   Correct Incorrect
4. Luke Skywalker promises C-3PO to lie down. Have him lie down.
   Correct Incorrect
5. C-3PO promises Luke Skywalker to stand on the book. Have him do it.
   Correct Incorrect

ASK/TELL

Conversation Portion (Criterion for success: 4 out of 5 correct)

1. Ask_____what color this book is. Correct Incorrect
2. Tell_____what color this pencil is. Correct Incorrect
3. Ask_____his/her last name. Correct Incorrect
4. Ask_____what to write on the paper. Correct Incorrect
5. Tell_____which pencil to put in the box. Correct Incorrect

Picture Portion (Criterion for success: 2 out of 2 correct)

1. Which picture shows the girl asking the boy what to paint?

1a 1b

Correct Incorrect

What is she saying to him?

2. Which picture shows the boy asking the girl which shoes to wear?

2a 2b

Correct Incorrect

What is he saying to her?

AND/ALTHOUGH (Criterion for success: 4 out of 4 correct)

Can subject interpret less complex sentences using and/although?

The cowboy scolded the horse for running away. Who ran away?

Although my favorite TV program was on, I_____.

1. Mother scolded Gloria for answering the phone, and I would have done the same. What does this sentence say I would have done?

Scolded Gloria answered the phone

Correct Incorrect

2. Mother scolded Gloria for answering the phone, although I would have done the same. What does this sentence say I would have done?

Scolded Gloria	answered the phone
Incorrect	Correct

3. The cowboy scolded the horse for running away, and I would have done the same. What does this sentence say I would have done?

Scolded the horse	run away
Correct	Incorrect

4. The cowboy scolded the horse for running away, although I would have done the same. What does this sentence say I would have done?

Scolded the horse	run away
Incorrect	Correct